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(54) **ARCHERY BOW RISER PROVIDING UNIVERSAL FIT, IMPROVED STABILITY AND MUSCLE TRANSFER FOR EXTENDED HOLD TIME**

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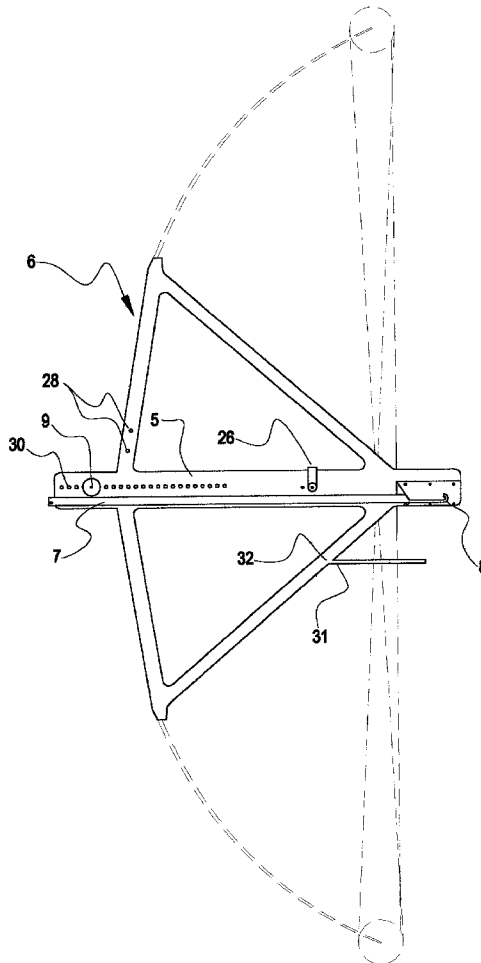
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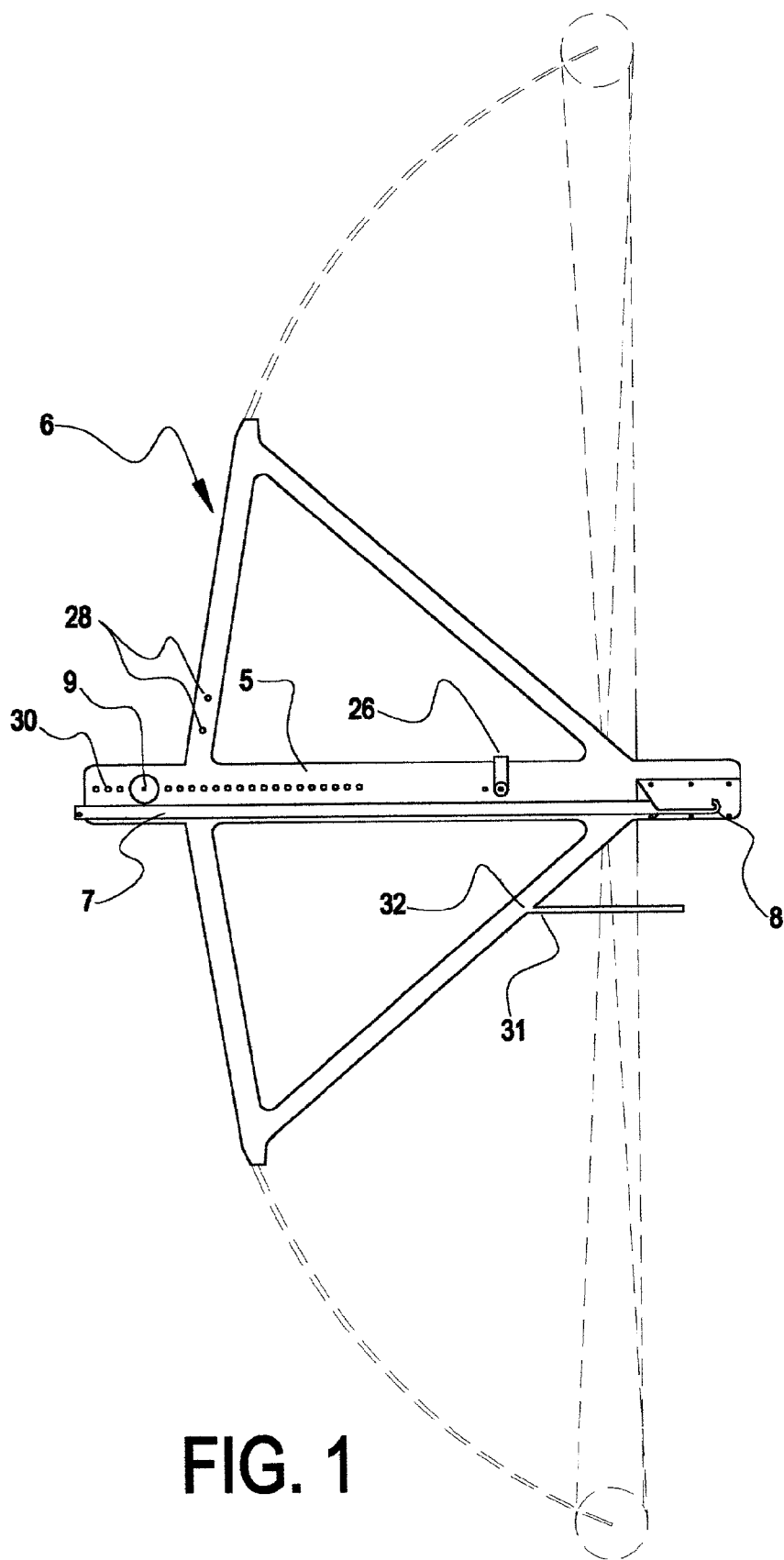
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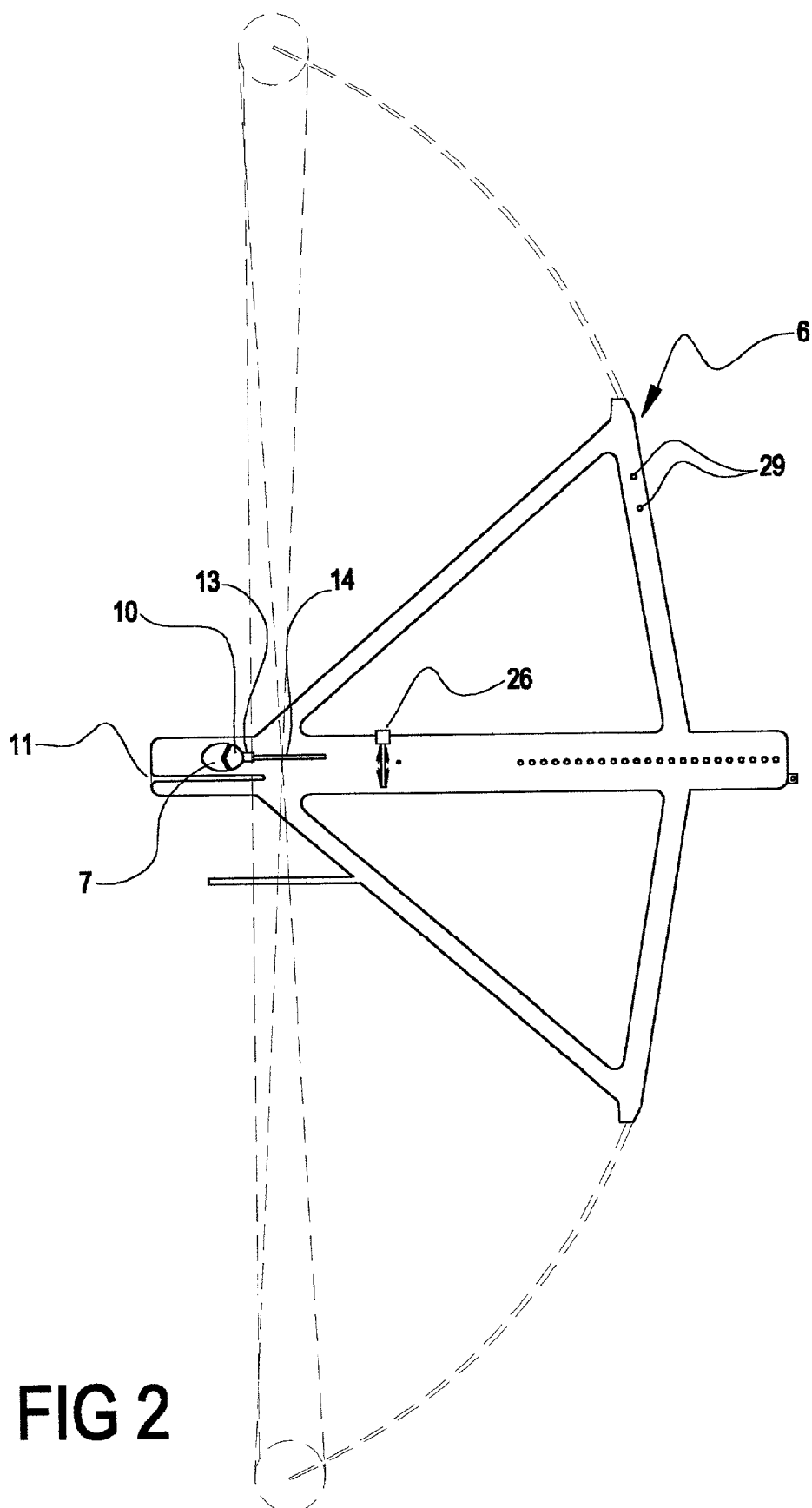
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(57) **ABSTRACT**

An archery bow riser having an elongated central body and two opposing arms attached at the far end of the central body and extending outwards to attach opposing bow limbs. The central body having a stabilizer tube support channel extending along a portion of the body, to which is fitted a stabilizer tube. The stabilizer tube slidably engaging the stabilizer channel, the stabilizer tube and channel having cooperating locking means to lock the tube in the channel in a full draw position. The riser having a draw handle design comprising two half handles. The half handles, when drawn and held together after stabilizer tube to channel lock, maintain the bow string at full draw tension. The riser having a plurality of mounting positions for an adjustable front handle. The adjustable front handle providing universal fit of the riser to a variety of users. The in close riser design providing improved balance. The riser body together with the stabilizer tube and channel providing improved stability and accuracy. The short draw providing use of shorter and faster arrows; and the split half handle design providing a greatly extended full draw hold time due to reduced muscle strain and the transfer of full draw muscle load from the back to the fore arm.







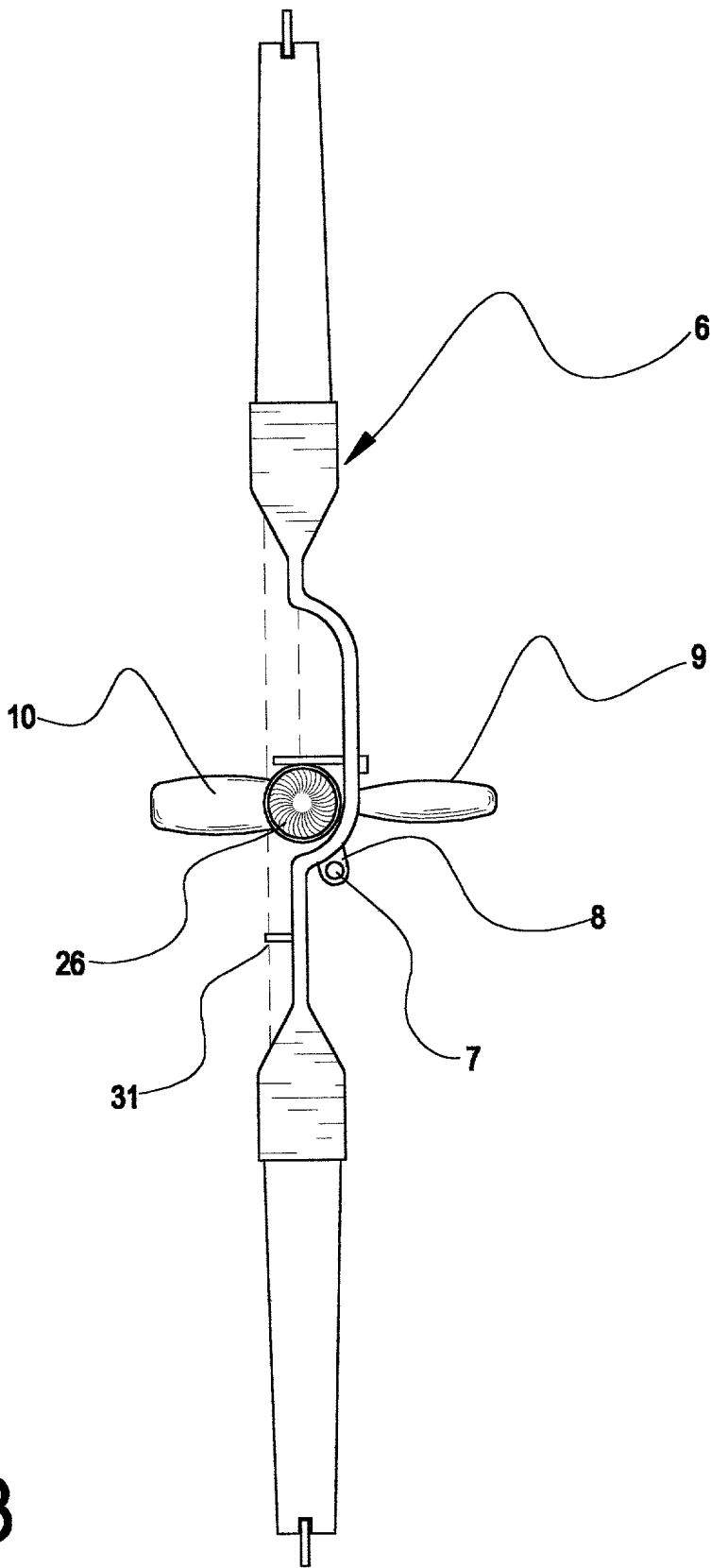


FIG 3

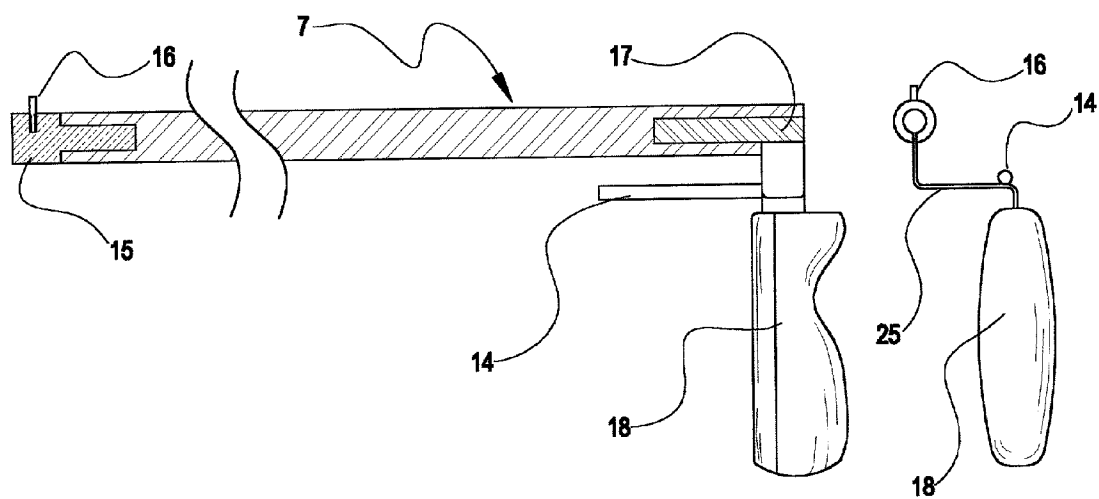


FIG 4

FIG 5

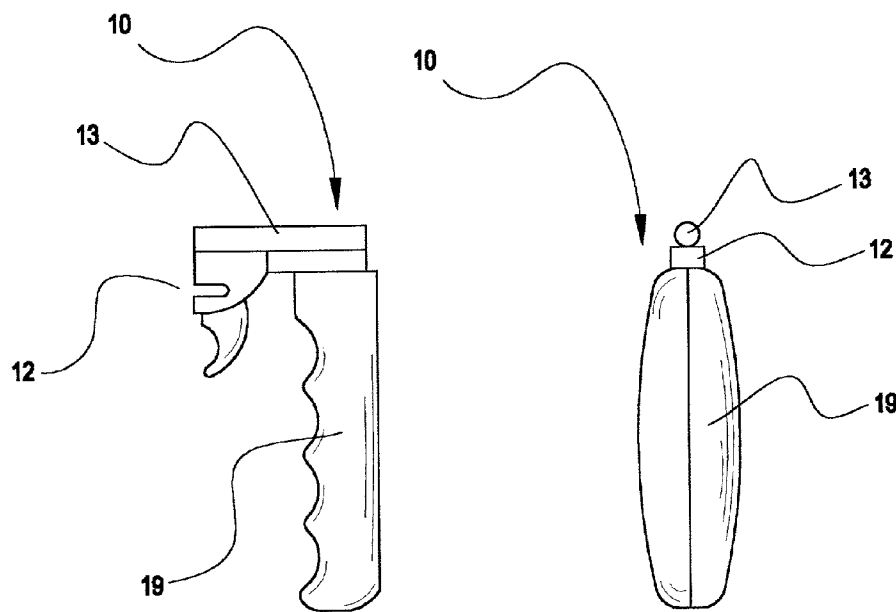


FIG 6

FIG 7

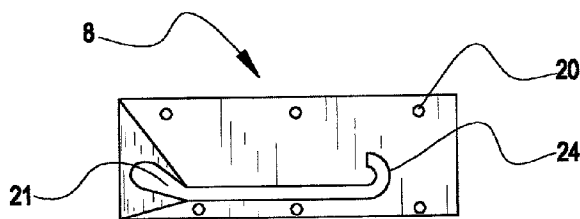


FIG 8

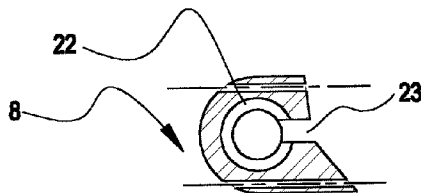


FIG 10

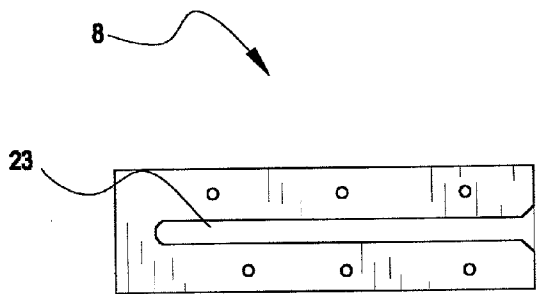


FIG 9

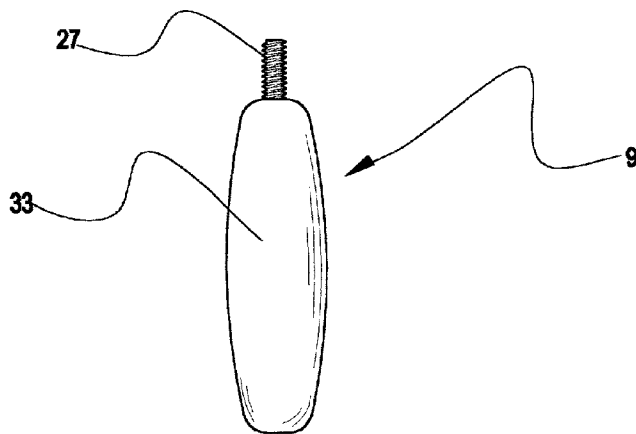


FIG 11

ARCHERY BOW RISER PROVIDING UNIVERSAL FIT, IMPROVED STABILITY AND MUSCLE TRANSFER FOR EXTENDED HOLD TIME**CROSS-REFERENCE TO RELATED APPLICATIONS**

[0001] Not Applicable

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not Applicable

REFERENCE TO A MICROFICHE APPENDIX

[0003] Not Applicable

FIELD OF THE INVENTION

[0004] This invention relates to the general field of archery bows and bow risers, more particularly to the field of devices to provide universal fit, accuracy, reduced preparation time and extended full draw hold time by transferring full draw hold muscles from the back to the forearm.

BACKGROUND OF THE INVENTION

[0005] The design of the modern vertical upright bow has evolved over time from the long bow and into various more modern designs of compound bows. With the evolutionary development of the archery bow has occurred the development of a variety of useful accessories such as arrow rests for overdrawn arrows, stabilizers and stabilizer bar designs in various forms, and mechanical draw string release mechanisms.

[0006] Archery bow risers provide the central body of compound archery bows. Traditional compound bows comprise a riser, which serves among other uses as the handle section, and upper and lower bow limbs attached to the riser and extending outwards therefrom. The limbs terminate in an opposing pair of eccentrics or cams, rotably mounted to the ends of the bow limbs. A bow string extends from each eccentric to the opposing bow limb.

[0007] Bow risers include a handle for holding the bow, mounting points for the attachment of bow limbs at opposing ends of the riser, cable guards, as well as attachment means for sights, arrow rests, arrow quivers, etc. A bow propels an arrow by converting the large amount of potential energy stored in the bow limbs when the bow is drawn back by an archer to the kinetic energy of the ejected arrow. The energy stored is stored in the bow by bending the limbs of the bow. Risers are, by design, relatively rigid. The bow riser which attaches the opposing limbs must be designed to withstand the large amount stresses which are applied at its ends by the limbs as the bow string is drawn. To withstand such stresses, modern risers are machined or cast from metals such as aluminum or magnesium.

[0008] Recent developments in compound bows have equipped some bows to utilize shorter arrows by the inclusion of an overdraw arrow shelf and rest. Often archers prefer to shoot a shorter arrow because of its reduce mass and higher speed.

[0009] When an archer prepares for a shoot or a hunting season, substantial amounts of time and effort are often

dedicated to the conditioning of muscles and achieving a precise and repeatable pattern, or skill, to achieve shooting accuracy. In archery, as in other endeavors requiring learned skills, practicing drawing and shooting arrows makes for improvement in results. But some who enjoy archery and/or hunting who suffer from sore joints and muscles, perhaps from age or work related repetitive injuries, can find that the more that they practice the harder it is to maintain accuracy. In fact, accuracy may decrease. This is aggravating and discouraging to archers who are so afflicted.

[0010] When a bow is held in the drawn position in readiness to take a shot, the archer's muscle strain and effort to hold the bowstring fully drawn can be substantial. As the bow is held drawn in readiness, the archer's fatiguing muscles introduce vibrations and drift of bow alignment to target, affecting ultimate shooting accuracy. Also, there is substantial muscle and joint discomfort resulting from holding a bow fully drawn for a period of time.

[0011] Many archers so afflicted may feel their only option is to give up archery or archery hunting altogether. It would be beneficial to these archers for an invention to be provided to reduce the muscle and joint pain resulting from holding a bow string fully drawn by providing a novel means of transferring the holding muscles from the back to the hand/forearm.

[0012] It would be advantageous to provide a bow riser design that provides universal fit for all users, and better balance and stability resulting from an 'in close' design. In this in close design, the front handle would be adjusted to comfortably fit the user's reach while bringing the bow in closer to the body trunk than would be possible with conventional bow and riser designs. In bringing the bow closer to the body, additional benefits could be achieved in reduction in the torque load to the forearm and back muscles in overcoming gravity's pull in holding the bow elevated in in position in preparation for shooting.

[0013] It is typical in the present art to select arrow lengths and bows to comfortably fit their body dimensions and physique. It would be beneficial to provide a new riser design which provides a universal fit to all users and allows for the use of one, perhaps standardized, length arrow.

[0014] Additionally, in certain states and localities it is illegal for an archer to utilize a bow design or bow accessories which provide a draw string lock means which mechanically locks and maintains a draw string drawn for firing, with some exceptions for the handicapped. An example of such a design is a cross bow. Many well known draw lock mechanisms and designs may therefore be in use illegally by archers and hunters. Additionally, it can be appreciated that possible injury and safety concerns make the use of draw locks that maintain a bow 'cocked' and ready to fire even when the bow is unattended is undesirable and sometimes illegal. Such laws and concerns make crossbows illegal for hunting in some localities. It would be advantageous to provide a novel riser design which incorporates a draw string hold design which relies upon and requires the archer to muscularly maintain the bow in full drawn position. Such a design would require an archer to be consciously preparing and planning a shot, and would not maintain a bow drawn for use without the archer's continual muscular tensioning and attention. Advantageously such a novel draw string hold design would be relatively easy for

an archer to maintain at full draw, and not require the archer to suffer the considerable effort and strain of manually holding the bow fully drawn through the use of the back and upper arm muscles.

BRIEF SUMMARY OF THE INVENTION

[0015] According to the invention, an archery bow riser having an elongated central body and two opposing arms attached on opposite sides of one end of the central body, the arms extending outwards from the central body. The bow riser arms are equipped to attach flexible bow limbs, which are components that are separate from the riser and part of a complete archery bow assembly. The limbs may be attached to the riser arms using a bolt and slot arrangement or other commonly practiced methods known to those in the art.

[0016] The central body of the riser has a stabilizer tube support channel extending along a portion of the body, to which is fitted and inserted a sliding stabilizer tube. The stabilizer tube and stabilizer support channel having cooperating locking means to lock the stabilizer tube in the channel in a full draw position. The riser features a draw handle design comprising two half handles. The two half handles incorporate a self aligning 'V' fit on mating half handle faces. The two half handles, when drawn together and held together by the archer after the stabilizer tube and channel lock, are designed to maintain the bow string at full draw tension until either the bow string trigger release is operated, or the user pulls the handles rearward away from the bow and twists the handles to release the locking means. Advantageously, this feature provides extended full draw hold time, by transferring muscular tensioning from the back muscles to the forearm and hand. The archer must continue to squeeze the half handles together to maintain a full draw bow string tension, but with the present invention, maintaining full draw is now a less tiring and stressful situation, allowing for longer full draw hold times than with previous designs.

[0017] It is an objective of the present invention to provide an archer with a bow design which provides an extended period of hold time between the moment the bow is fully drawn until the arrow is ultimately sighted and released towards the target.

[0018] As noted earlier, in certain localities it is illegal to use a bow string lock mechanism which mechanically locks and maintains the draw string tensioned for firing, as in a cross bow. The present invention advantageously avoids this issue by providing a novel riser design which relies upon the archer to muscularly and yet easily maintain the draw string at full draw.

[0019] Tensioning the draw string to full draw position occurs as follows in the present invention. The front and rear half handles are drawn into confronting alignment on the stabilizer tube. The half handle assembly with the bow string trigger release mechanism is positioned to the bow string rest position and then the trigger mechanism is locked to capture the bow string in the trigger release bow string retention device. The mated half handles with the stabilizer tube are then drawn rearwards towards the archer until the locking pin on the stabilizer tube locks into the locking pin capture point on the stabilizer tube support channel, at which point the stabilizer tube is locked in an extended full draw

position in the stabilizer tube support channel and the bow string is held tensioned at full draw by the trigger release means on the front half handle and by the muscular contraction of the archer's hand in holding the front and rear half handles together. At this point, the upper arm and back muscles are no longer needed to maintain full draw, full draw being held solely by the contraction force of the archer's hand

[0020] It is another objective of the present bow riser design to incorporate a draw string full draw retention means which provides an archer with an comparatively low effort means of muscularly holding a bow fully drawn, and relying on the archer to hold the full drawn position, thereby avoiding the legalities of conventional, well known, bow full draw retention designs.

[0021] Advantageously the riser design of the present invention provides a universal fit to all users and allows for the use of a standardized short length arrow. This is accomplished by the short draw design, and the adjustable front handle which allows the bow to be brought in closer to the user than in current art bows by allowing the front hand hold to be moved forward on the riser to a position specific to and comfortable for the user.

[0022] It is an objective of the present invention to provide a much shorter than typical bow string draw distance and the ability for even larger people to shoot a standardized short length arrow. This riser design allows a standardized short length arrow to work for all users.

[0023] The use of a shorter arrow provides desirable benefits to the archer. Because of its reduced mass, a shorter arrow can be launched at higher speeds, and because of the higher speeds the arrow will travel a given distance with less droop or loss of height than a conventional heavier, slower arrow. In this way, use of shorter lighter arrows improves an archer's accuracy. This higher speed and accuracy is a further objective of the invention.

[0024] The stabilizer tube support channel has a self lubricating insert in which the stabilizer tube rides in the channel. This insert provides smooth and noise free operation of the stabilizer tube in the channel when tensioning the bow in the field. The self lubricating insert can be a point of wear in the field, requiring occasional replacement. The support channel is designed as a bolt on component to the riser to facilitate replacement of the insert. The stabilizer tube support channel further incorporates a tapered capture point at the forward end, the tapered capture point guiding the stabilizer tube locking pin into position for entry into the slot leading to the locking point as the stabilizer tube is drawn through the channel.

[0025] In the present invention the hand grip is no longer on the main riser section as in the prior art. Front hand grip is adjustably mounted to the side of the riser, while the split half handles on the stabilizer are positioned on the opposite side of the riser. The front handle grip positioned on the opposite side of the riser from the half handles, as well as the common horizontal alignment of the axis of the grip and handles, results in improved stability. Removal of the prior art handle grip on the main riser permits the arrow and arrow rest to be positioned closer to the center of the bow than would otherwise be the case. This closer spacing means less torque is applied to the arrow and cable guide, resulting in

increased accuracy. The arrow in the present invention is released from the natural center of the bow.

[0026] The riser presented herein achieves bow stability from overall design. By combining the claimed riser with components of a short draw bow with a short axle to axle results in a compact bow design wherein the front handle is adjustably positioned on the riser forward of the present art. Additionally, in the present invention the support channel is positioned rearward of the axis of the bow providing a leverage point on the riser that, combined with the short stabilizer tube or "draw", a forward mounted handle, will form a rigid and stable full draw position. The claimed riser also achieves increased full draw balance by bringing the bulk of the bow closer to the body of the archer.

[0027] Further advantages of the present invention can be appreciated by reading the descriptions, claims and review of the drawings that follow.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] The drawings show a form of the invention which is presently preferred, however the invention is not limited to the precise arrangement shown in the drawings.

[0029] **FIG. 1** is a left side view of a right hand riser at rest, depicting main components and leverage points required for optimum performance with multiple users.

[0030] **FIG. 2** is a right side view of a right hand riser at rest, showing remaining components and mounting locations.

[0031] **FIG. 3** is a perspective of the front of a right hand riser at rest.

[0032] **FIG. 4** is a side view and **FIG. 5** is an end view of the stabilizer tube and rear half handle depicting alignment pin and locking pin, and the handle taper for the 'V' fit.

[0033] **FIG. 6** is a side view and **FIG. 7** an end view of the front half handle incorporating alignment tube along with trigger assembly, and the handle taper for 'V' fit.

[0034] **FIG. 8** is a front side view, **FIG. 9** is a rear side view, and **FIG. 10** is a back end view of the stabilizer support channel depicting guides and locking points for stabilizer tube and half-handle **FIG. 4**.

[0035] **FIG. 11** depicts the threaded front support handle.

DETAILED DESCRIPTION OF THE INVENTION

[0036] **FIG. 1** shows the basic configuration of the riser (6). Front handle (9) is allowed to combine with a multitude of mount locations (30) on riser central body (5) to produce a universal fit to a multitude of users. This, in turn, brings the overall component closer to the body for increased ease of balance. The riser is designed to work in conjunction with components such as limbs, cables, pulleys of an advanced high speed, short draw length bows, such as Hoyt Hypertec manufactured and marketed by Hoyt USA of Salt Lake City, Utah, or Matthews SQ2 manufactured and marketed by Matthews Incorporated of Sparta, Wis.

[0037] The stabilizer tube (7) along with the support channel (8) and the location of the support channel produce many advantages. Conventional riser's hand gripping points

must be vertically and horizontally centered on the riser for elimination of vertical or horizontal movement or torque that affects accuracy. This invention (6) incorporates vertical centering and also allows for vertical centering of an arrow by placing the arrow on the opposite side of the riser gripping point. The need for horizontal centering of the riser gripping point is overcome by the position in go the stabilizer support channel (8) nominally 5 inches behind the axis of the bow, and the gripping point of the riser being significantly forward of the axis of the bow. Using these points of leverage counteract natural leverages produced from having riser gripping point off center of horizontal plane. In the preferred embodiment stabilizer tube (7) extends rearward only 15 inches off riser body (6) to provide stability while also allowing archers to shoot a shorter, lighter arrow.

[0038] **FIG. 1** also shows site mounting locations (28), arrow rest mounting location and arrow rest (26), cable guard (31) and mounting location (32).

[0039] **FIG. 2** is a right hand view of right hand riser (6) at rest. The arrow rest depicted (26) is a disk shaped coil brush type, a preferred example of which is taught by U.S. Pat. No. 5,896,849 to Branthwaite, et al. The stabilizer tube and rear half-handle assembly (7) are engaged with trigger half-handle assembly (10) (depicted in **FIG. 6**) with trigger engaged on string in rest position. Riser (6) is slotted (11) to receive upper portion of rear half-handle (18) in rest position. Also shown, arrow quiver mounting location (29), for attachment of quivers well know to those in the art.

[0040] **FIG. 3** is a front view of riser (6) in rest position, depicting riser (6) and positioning of arrow rest (26), cable guard (31), front trigger half-handle (10), adjustable front handle (9), stabilizer tube assembly (7), and stabilizer tube support channel (8).

[0041] **FIG. 4** is the stabilizer tube rear half-handle shown in side view, and **FIG. 5** in end view. In the preferred embodiment stabilizer tube (7) is a 1/2 inch aluminum alloy with a solid insert (15) on front end allowing for locking pin (16) to be threaded into. Locking pin (16) nominally 3/16 inch threads out of solid insert (15) for easy removal of stabilizer tube assembly (7) with rear half-handle (18) from riser (6). Stabilizer tube (7) has a solid insert (17) which extends outwards to produce the rear half-handle (18). Rear half-handle alignment pin (14) is fixed to rear half-handle (18). In the preferred embodiment alignment pin (14) is 5/16 inch by 2 inches long. Rear half-handle (18) also has a formed nylon (or similar material) overlaid to produce a comfortable half-handle fit.

[0042] **FIG. 6** is a front half-handle (10) assembly depicted in a side view, and **FIG. 7** in rear view. A solid core handle comprising alignment tube (13), trigger assembly (12), a similar bow string trigger lock mechanism disclosed in U.S. Pat. No. 4,509,497 to Geary L. Garvison and sold as "Winn Archery" model C-10. The solid core is overlaid with a formed nylon (or similar material) (19) to produce a comfortable half-handle fit. Front half-handle alignment tube (13) encases rear half-handle alignment pin (14) to produce a full handle as shown in **FIG. 2**.

[0043] **FIGS. 8, 9** and **10** depict is the stabilizer tube support channel (8) and locking point (24). **FIG. 8** is a front view, **FIG. 9** is a rear side view, and **FIG. 10** is a back end view. Front side view shows the tapered capture point (21)

of the locking pin (16) during draw, and locking point (24) at full draw. In the preferred embodiment six mounting screws through holes (20) attach the support channel (8) to riser (6). Rear side view shows slot (23) which matches up with slot (11) shown in FIG. 2, to receive rear half-handle location (25) shown in FIG. 5. Back end view shows receiving slot (23) for rear half handle location (25) of stabilizer tube (7). An insert (22) of self lubricating nylon (or similar material) is utilized in the stabilizer tube support channel (8) to provide quiet and smooth operation of stabilizer tube (7) contacting points.

[0044] FIG. 11 is a solid core handle (27) threaded for easy installation in multiple locations on riser (6). Core is overlaid with nylon (33) or similar material to produce a comfortable hand grip point.

I claim:

1. A riser for an archery bow providing universal fit while allowing archers to use a shorter, faster arrow, the riser comprising:

- (a) a riser central body having an opposing far end and a near end wherein the near end is closest to an archer and the far end is furthest from the archer and provided with a plurality of mounting locations along a portion of the central body between the near end and the far end; and
- (b) a front handle which can be moveably repositioned to user selected mounting locations along the central body to fit the bow draw length to multiple archers.

2. The riser for an archery bow of claim 1, wherein:

- (a) a stabilizer tube support channel fixed to the central body at a position between the near end of the central body and an axis defined by a bow string rest position; and
- (b) a stabilizer tube having a portion thereof slidably mounted inside the support channel, the stabilizer tube extending outwards beyond the near end of the central body providing a leverage holding point for stability of bow.

I claim:

1. A riser for an archery bow providing universal fit while allowing archers to use a shorter, faster arrow, the riser comprising:

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- (b) a front handle which can be moveably repositioned to user selected mounting locations along the central body to fit the bow draw length to multiple archers.

2. The riser for an archery bow of claim 1, wherein:

- (a) a stabilizer tube support channel fixed to the central body at a position between the near end of the central body and an axis defined by a bow string rest position; and
- (b) a stabilizer tube having a portion thereof slidably mounted inside the support channel, the stabilizer tube

extending outwards beyond the near end of the central body providing a leverage holding point for stability of bow.

3. An archery bow riser providing muscle transfer for extended full draw hold time, the riser comprising:

- (a) an elongated central body portion having a near end and an opposing far end, the riser having two opposing arms attached to the far end of the central body portion, the central body portion positioned intermediate and substantially perpendicular to the opposing arms, the arms extending outwards and coplanar with the central body portion, the each arm equipped to mountably attach a flexible bow limb, the central body portion provided with a means of mounting an arrow rest thereto;
- (b) a stabilizer tube support channel mounted to and extending along a portion of the riser central body, the support channel having a slot terminating in a locking point;
- (c) a stabilizer tube having a near end and a far end, the far end and a portion of the stabilizer tube slidably mounted inside the support channel, the far end having a locking pin affixed to and protruding radially from the stabilizer tube, the locking pin sized to slidably engage and ride within the support channel slot, the locking pin sized to retentively engage the locking point when the stabilizer tube is extended to a full draw position; and
- (d) a draw handle assembly comprising:

- i. a front half handle having an upper and lower end, the upper end having a half handle alignment tube and a trigger release bow string retention means mounted thereto,
- ii. a rear half handle fixedly attached to the near end of stabilizer tube, the rear half handle having a handle alignment rod sized and positioned to be slidably received in the half handle alignment tube such that the front half handle and the rear half handle when drawn and held together are positioned in mating confronting alignment by the alignment tube and alignment rod, the front half handle and the rear half handle being sized and formed to produce a complete draw handle when drawn together by an archer's hand and forearm muscles, the trigger release bow string retention means releasably drawing and tensioning the bow string as the front half-handle is drawn to mate together with the rear half handle, the alignment rod and tube aligned to permit bow string tension force to retract the front half handle and trigger from the rear half handle, thereby release bow string tension when the archer's hand grip is released.

4. The archery bow riser of claim 3 wherein the riser includes at least one connecting support member extending between central body and arms.

5. The archery bow riser of claim 4, wherein at least one connecting support member is two connecting support members.

6. The archery bow riser of claim 4, wherein a means is provided for mounting a cable guard to the connecting support member along a portion thereof laterally offset from

the central body of the riser, and a means is provided for mounting a site to a portion of an arm of the riser.

7. The archery riser of claim 3, wherein the stabilizer tube support channel has a tapered capture point and wherein the support channel is detachably mounted to the riser central body by a plurality of screws.

8. The archery riser of claim 7, wherein the stabilizer tube support channel has a self lubricating insert in which the stabilizer tube rides to provide quiet and smooth operation of the tube in the channel.

9. The archery riser of claim 8, wherein the self lubricating insert is comprised of nylon.

10. The archery bow riser of claim 3, wherein the riser includes an adjustable front handle, and wherein central body portion has a plurality of holes at intervals along a portion of the central body between the near end and far end, the holes sized and positioned to provide a plurality of mount positions from which a user can select and detachably mount the adjustable front handle.

11. The archery bow riser of claim 10, wherein the adjustable handle mounting holes on the riser central body are threaded, and the adjustable handle comprises a solid core with a threaded portion protruding therefrom, the thread

portion sized and formed to thread into the adjustable handle mounting holes on the central body.

12. The archery bow riser of claim 11, wherein the adjustable handle solid core is overlaid with a molded material, molded to form a comfortable hand grip.

13. The archery bow riser of claim 12, wherein the molded material is nylon.

14. The archery bow riser of claim 9, wherein the riser includes an adjustable front handle, and wherein central body portion has a plurality of holes at intervals along a portion of the central body between the near end and far end, the holes sized and positioned to provide a plurality of mount positions from which a user can select and detachably mount the adjustable front handle, the holes positioned to align vertically with the half-handles.

15. The archery bow riser of claim 14, wherein the half-handles are formed to provide a self aligning 'V' fit, and wherein the adjustable handle mounting holes on the riser central body are threaded, and the adjustable handle comprises a solid core with a threaded portion protruding therefrom, the thread portion sized and formed to thread into the adjustable handle mounting holes on the central body.

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